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ABSTRACT

Parents can help students learn science in a variety of ways. Taking advantage of children's natural curiosity, parents can take short walks with their child to notice interesting things in the environment. Parents can also help students perform science experiments at home that are related to school science experiments. In addition, parents can encourage children in observing science, such as discussing tornadoes or different types of trees. A trip to a museum and video tapes on science topics can also encourage an interest in science. Even family pets can become a source of science discussion. Parents need to take advantage of every possible opportunity for their child to understand science. (PM)

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Helping Your Child in Reading in Science.

ED 479 374

by Marlow Ediger

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HELPING YOUR CHILD IN READING IN SCIENCE

Science taught in the school setting needs adequate emphasis. Why? People live in a world of science. The soil, rocks, air, foods eaten, clothes worn, buildings built, and the atmosphere, have a scientific component. They can be described in terms of chemical elements and compounds contained as well as describes how something operates. "Science is all around us," is stated frequently. Young children have a tremendous interest in science. A two year old is curious pertaining to the water that comes from a garden hose used in irrigation or rocks in the back yard. He/she will point to many things, including the water coming from the hose, and wonders where it comes from. These two year olds already point to pictures in a supermarket and repeat the names for each, like "car," "truck," "bus," and so on. For other illustrations, they want to know the names of each. The curiosity is truly to be admired and needs to be encouraged. This curiosity must be fostered and grow continuously. What then might be vital objectives for children to achieve at home in science learnings?

Objectives to Emphasize in Science

The parent needs to focus on selected objectives in science which help children to learn as much as possible. In the above first paragraph, the goal of curiosity was stressed. There are a number of ways to develop increased curiosity for science content in children. The parent should take short walks with the child to notice interesting things in the environment. The child certainly becomes fascinated with mud puddles after a rain, evaporation of the water after a few days, rain and clouds, snowfall, sleet, hail, hot and cold weather, among other things. These can be noticed directly and observed carefully . The child may ask questions of not only what it is, but also where do these things come from. The "why" of something is very important. The concept of "rain" can be explained quite meaningfully. Reference books may be used here to read and discuss with the young child what is meant by "rain" along with other important scientific concepts.

Second, doing experiments and demonstrations is the heart of science. Parents together with the child may perform science experiments in the home setting. These experiments should relate to what is being studied in school science lessons, but they can also be performed within the framework of present interests which children possess. The experiment may be as simple as placing a small amount of iodine on a potato to test for

starch content. If the potato changes its color to purple, it does contain starch. The important thing is that the child observes carefully what is actually happening in the experiment. When he/she is ready, the child may assist with setting up the materials and equipment needed to do increasingly more complex science experiments. The child receives much joy by being given special attention by the parents when doing experiments together. The personal attention given is very sound psychologically and should aide the child's all around achievement in life.

Third, the parent needs to engage the child in observing science. The child's curiosity is important but so is the role of the parent salient in stimulating interest in science. Parents then need to discuss scientific phenomena. Newscasts are a good source for content here. There are a plethora of news items pertaining to science which may interest the older child. Tornados make their rounds each year in the United States. The damage they cause is horrendous. Large deciduous and evergreen trees may be uprooted in their entirety. A new solid brick house may be destroyed in a tornado! Large trucks and cars may be lifted off the ground depending on the intensity or strength of the tornado. When young children see sights of tornado results, they ask many questions. They see on the television screen the damage resulting from hurricanes. The author well remembers a man who was interviewed about damage done by nature, including a tornado, all of which he had experienced. He broke down and cried vehemently over the horrors of the damage. Another person was interviewed pertaining to a new expensive house he had built on a hillside. Erosion ruined the entire structure. Humans need to cooperate, not work against, nature. Newscasts are a good way to introduce children to science content. Parents need to observe that the young child does not become emotionally distraught over these kinds of events. Should this be in evidence, the parents, for example, may look instead at picture books with the child to notice different kinds of plants with their roots, stems, leaves, and flowers. Pupils should raise questions about each of these parts and their role in plant functions. Wholehearted engagement in science may come about when a child examines the different parts of a plant. A magnifying glass and a microscope may well be used in the careful study of different parts of the plant and their functions.

Fourth, having reasons or purpose for learning are important. A child may have many questions about plants and animal life in which museums of natural history provide much needed content on animal life. These museums are prepared to

show plant and animal life in reality, diorama form. One section of a natural history museum contained the following plants and animals with related script of the arctic tundra:

* a treeless, cold region covering northern Alaska and Canada. The soil is frozen throughout the year except for summer when plants take root in the surface layer.
* very short trees such as gnarled, dwarf birch trees which show influences from the severe long winters.
* map lichen on rocks.
* musk ox which form a circle in the cold north to protect themselves from wolves and also provide for some warmth within the circle.
* caribou which eats summer vegetation and lichens from rocks in winter. They migrate southward for winter.
* the gray wolf which needs much energy to survive in winter. They hunt in packs and feed on musk oxen when possible. It is dangerous to attack the musk oxen when they are in a circle. The musk ox has a strong kick for self defense and yet the gray wolf needs to prey on animals to survive. Gray wolves, when hunting in packs, need much food and keep attacking until they get their prey no matter how dangerous it may be from potential kicks of the musk ox.
* The grizzly bear also needs much feed to maintain the self as well as look for prey. They feed on animals such as the Arctic Gray Squirrel, among other animal life. The grizzly bear needs to feed heavily in the summer months to get ready for hibernation in the cold winter months.
* Other animals include the Tundra Swan, the Willow Ptarmigan, the Polar Bear, and the Common Raven.
* the Tundra contains much snow, especially during the winter months, which makes it a beautiful site to view.

Museums of natural history can provide pupils with much purposeful information as well as to continue the informational quest through questions. Also, there are excellent library books on the frozen Tundra, among other regions on the planet earth. They contain excellent illustrations of plant and animal life. Children do enjoy and like to learn from these illustrated books. The fascinating part is how these animals and plants can survive in such a very harsh climate as the Tundra. Younger and older children ask many questions about these illustrations and do reveal a curious mind which desires to learn. Learners are also interested in the abundance of life found in rain forest regions, the great plains area, and the South Pole. Different regions have unique plants and animals which children may wish to learn about.

Fifth, there are video tapes available on scientific topics, designed for young children. A delightful video tape on physics involving he use of simple machines can clarify ideas and present useful information in a meaningful manner. These simple machines may also be available in the home setting to do science experiments. These simple machines include the lever, the screw, the pulley, the wheel and axle, the wedge, and the inclined plane. Each of these simple machines may be observed in pictoral form. The home setting may also have the real objects such as an inclined plane. A board may be used here to show the differences between lifting an object weighing one pound to a height of one foot as compared to sliding the object (one pound) upward along the inclined plane, also to a height of one foot. The amount of work done here is force (lifting the object) times distance (one foot in height). One pound lifted times one foot in height equals one foot pound. Force (one pound) times distance (one foot) equals the work performed.

Sixth, many pupils have pets in the home setting. It is common to see an aquarium with swimming gold fish therein. Children need to spend time in watching the fish. Thus, the characteristics of fish are noticed. This is the lowest classification of animals with a backbone. Sometimes in spring, children have frog eggs in a jar. It is fascinating to notice the tiny frogs in the eggs grow. The tiny tadpoles eventually grow legs. The adult stage has been reached. The stages of life are egg; tadpole; and frog. Frogs are classified as amphibians due to living part of their life in water, like the tadpole stage of development, as compared to the adult living on land. Directly above amphibians are reptiles. Sometimes a child has a harmless snake as a pet. Snakes, alligators, turtles, and crocodiles are classified as reptiles. Reptiles generally have a three chambered heart and are covered with scales. Fish, amphibians, and reptiles are cold blooded. Their body temperature depends upon the temperature of the environment. The next two classifications of animals are warm blooded. Their body temperature is constant regardless of environmental temperature readings. Above reptiles in classification then are birds. Their body temperature usually is 110 degrees Fahrenheit. Their bodies are covered with feathers and they possess wings for flight. The highest classification of animals is mammals. Human beings are mammals and have a constant body temperature of 98.6 degrees Fahrenheit. Human beings have hair on part of their bodies and their young receive milk from the mother. This is a general summary of characteristics of animals with backbones. These categories can be learned in great depth as the child progresses through the public school years as well

as in higher education.

Seventh, young children may notice parasites on pets they own. Parasites live off of others who possess blood. When a mosquito is swatted, generally there will be some blood the organism has drawn. Ticks on cats and dogs in the summer months can be quite large in size due to blood drawn from the hosts, that is the cat or dog. Mites and lice can also be noticed and are parasitic due to living off of other animal life forms. The preceding parasites mentioned are illustrated on pet care containers such as lice powder for dogs and cats. Encyclopedias have entrees, with pictures, on parasites which can be read and discussed with children. Pupils need to be ready for listening and participating in the reading activity so that what is learned makes sense.

Eighth, when taking a walk with the son/daughter, the parent may point out different kinds of trees and leaf shapes which come from each tree. The fall months, especially, are a good time for tree viewing and making leaf collections due to the diverse colors involved on deciduous trees. Children should definitely learn about the differences between deciduous trees which shed leaves in fall and non deciduous trees such as evergreen trees. The author supervised university student teachers for many years in the public schools and in one school there was an adjacent nature area. The student teacher took her second grade school pupils out in this area for a nature walk. It was interesting to watch two rabbits scurry about among the plants. The rabbits were interacting with their environment for food as well as shelter from enemies. There was a small garden which had been planted in late February which now in early May had mature radish plants. A few plants were pulled up for children to notice the leaves, root system, and the stem. Pupils took careful note of each part. These plants were compared with carrots which were growing nearby. Specific comparisons were made. Pupils learned what plants needed in order to grow such as sunlight, water, and rich soil. Similarities and differences among the plants were noticed. Providing a framework for children to study plants is important. They should know the parts of a plant and why these parts are salient. For example, roots, stems, and leaves have important roles to play in making for plant growth and sustenance. Parents need to assist pupils in studying real plants as well as those from reference books. The internet is generally a good tool to use in obtaining information about plants as well as down loading copies for reference work. Review and retention are salient factors in the child's education.

Ninth, many children fear lightning. A bolt of lightning and the loud crash which may follow can be explained scientifically.

The parent might not know all these things immediately. But he/she can read up on the concept of lightning in an encyclopedia, located in the home setting or in the public library. By writing up the salient parts of what has been read, the parent can explain to children what has happened to have a flash of lightning and what the clap of thunder was which followed. Children through a scientific explanation and discussion of meaningful ideas may come to understand this occurrence. Perhaps, the fear will lessen also when the causes of lightning are understood better. There are, of course, many adults who fear lightning and thunder. It has caused death of human beings and damage to property.

Tenth, the water cycle is interesting for children to learn about. The water from rainfall may cause puddles and mud. In a day, there may be no water left in the puddle. Water evaporates or goes back into the atmosphere. There will be more evaporation if the temperature reading is high and the air is dry. The water then becomes a part of the atmosphere and may be in the form of a cloud. When the air in the cloud becomes cold, some moisture will fall, since cold air cannot hold moisture as well as can warm air. By listening to weather forecasts, the parent can notice the variables which go into determining the kind of weather which exists presently. The child may notice evaporation of water from the fish tank in the home setting. The present level of water may be marked on the outside of the tank and observed again one day later to notice how much less water is present. Evaporation is in evidence.

Parents need to take advantage of every possible opportunity for their child to understand science. They need to learn with the child. There are times, too, when a teacher learns with children in science. These can be exciting times for the adult and children to learn together. There are additional science learnings which might well be emphasized in the home setting:

* parents may help young children become familiar with renewable and non-renewable sources of energy. Renewable sources of energy include solar, wind, and water. Solar energy is quite prevalent to observe when entering a car parked outdoors in right sunlight with very low temperature readings such as being below freezing. The interior of the car can be quite warm. Solar collectors on houses should also be noticed by pupils.

Wind energy can be noticed with pictures of wind turbines. There are numerous newspaper articles on wind turbine energy. The wind turbines are located in selected places where the wind blows strongly as in California and Kansas. As another form of energy, water energy is used to turn water turbines which are

housed in areas where there is a downward slope of water. The downward slope turns the water turbine which in turn produces electricity through means of a generator.

Non-renewablle sources of energy include petroleum. Petroleum can give out eventually. Vocabulary needs to be used which children understand. Renewable means it does not give out, whereas non-renewable can and does give out eventually as an energy source.

* the author likes to use a field guide to do mammal tracking. In his rural property, he has a pond for cattle to drink water. On the shore of the pond, there are a plethora of animal tracks. the tracks are those of opossums, deer, skunks, red fox, raccoons, among other animals. By carefully viewing the animal tracks and comparing them with the field guide, animal tracking becomes very interesting.

* parents and the child may plant a garden in even the smallest of areas. Here, young children may notice the rate of plant growth and the resulting fruits and vegetables. Sometimes, a parent may even have one tomato plant in a clay pot, inside the house. The child may watch and discuss the plant with the parent. If a small garden is planted, there are several factors to notice:

1. the germination rate listed on the garden seed package.
2. the average temperature reading of the soil before the seed is planted.
3. the distance apart which the seeds should be planted.
4. the amount of moisture needed to irrigate the plants.

* soil conservation is important to all. There might be a place near to the house which has soil erosion or a place can be driven to which has experienced soil erosion. Hopefully, something will have been done to halt the erosion such as seeding a grassed waterway. The seeded, grown grass prevents the soil from eroding due to rainfall. A model grassed waterway may be developed in a wooden box, about two feet by three feet in dimension. There needs to be a gully which indicates the erosion area and this is then surrounded by level top soil. The gully area is leveled and seeded to grass. Children should also notice the kinds of soil in which plants grow best such as in loam, sandy, or clay soil.

* experiments with plants and soil may be done. Three pots may be used here. One pot has loam, another has sandy, and the third has clay soil. The seeds used for the experiment should be from the same package. A bean seed or two may be planted in each kind of soil. The same amount of sunshine as well as water should be available for each plant. Plant growth may be

measured each day. The child and parents might then notice which kind of soil promotes plant growth best. There are three kinds of soil to test in this experiment.

* the child and his/her parents may do an experiment to show the damage which run off water can do to soil. Erosion of the soil may well be an end result. The equal area wooden boxes, approximately one by two feet may be used. One box has soil with a grass covering while the other has barren soil. The two boxes are slanted the same degree. With a water spray can, the same amount of water can be poured above each box. The child may then notice which of the two boxes of soil has the greatest amount of runoff soil. This can be clearly seen in the experiment.

* children should learn the three states of matter. Water then can be seen in liquid form and takes the shape of its container. Ice cubes taken from the freezing compartment of the refrigerator may be observed in a solid state. Water heated until it boils at 100 degrees Celsius (212 degrees Fahrenheit) can be noticed as a gas with its rising steam. Matter then can be observed in its three forms --- seen in liquid, solid, and gas forms.

* children enjoy experimenting with magnets. A bar magnet and a horse shoe magnet may be used here. To see which objects are attracted by a magnet, small containers might have different kinds of matter in each. The following might be placed in each small container; bits of paper, glass, a few seeds, water, wood, steel, a copper penny, a small piece of iron, and a nickel coin. The child may then test each container to see which kinds of matter are attracted by each of the two magnets.

* a child may enjoy making magnets. Pieces of cork, large enough to hold a steel needle, may be place in a pan of water. A needle may be placed on one of the corks. It will not be magnetized. That same needle may be stroked, in one direction only, using one of the magnets, and put back on the cork. Rather quickly, the magnetized needle floating on the cork will rearrange itself in terms of locating the north and south poles. Opposite poles attract and like poles repel. In a different experiment, each of the two poles may be located --- the north pole and the south pole. A bar magnet may be suspended from a chair. For the suspension, a string is wrapped around the bar magnet and attached to the top of the chair. A bar magnet may be used to test which is the north pole and which is the south pole. Opposite poles attract such as a north pole on a magnet will attract a south pole, as well as a south pole will attract a north pole. In this way, a magnet may be noticed in terms of which end has a north pole

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